REMARKS

The acknowledgment of the claim of foreign priority and receipt of the priority document is noted with appreciation.

Although the Examiner acknowledged receipt of the drawings, he did not check whether the drawings were accepted or not. Moreover, the drawings were filed with the application on April 19, 2001, not April 21, 2001, as indicated by the Examiner. Please provide an indication as to whether the drawings filed with the application are acceptable.

The specification has been reviewed and amended as appropriate to correct minor typographical and grammatical errors. No new matter has been added.

Claims 1 to 12 are presented for examination. Claims 1 to 6 have been amended, and new claims 9 to 12 have been added.

The disclosed and claimed invention is directed to real time recording/reproducing systems for recording and real time (instantaneously) reproducing image (or video) data. The invention solves a specific problem of such systems, namely real time recording/reproducing systems may make use of personal computer (PC) software processing. In such a case, performance insufficiency of CPU (central processing unit) may arise when the system is operated in parallel with other applications or at the moment of starting the same. In consequence, it becomes impossible to obtain full frame real time capturing, real time compression and real time decompression. This leads to missing of frame data in the compression processing and delay in the reproducing processing and also to a further problem of deviation from synchronism of image and voice to each other.

In the system according to the invention as shown in Figure 1, an analog-to-digital converter (ADC) 102 receives an analog image signal from an image input terminal 101. The output from the ADC 102 is to a frame memory 103, followed by a compression processing module 104, and then a recorder 105. A digital signal read from the recorder 105 is input to a decompression processing module 106, followed by a frame memory 107 and a digital-to-analog converter (DAC) 108, so that a reproduced video signal is output at output terminal 109. A

frame rate controller110 executes a frame interpolation process such as to provide a constant frame rate of reading of data from the frame memory 103 to the compression processing module 104. The compression processing module 104 executes digital compression processing in a compressing system, which conforms to, for instance, MPEG (Motion Picture Experts Group compressing system) standards.

Where the real time recording/reproducing system according to the claimed invention is constructed by making use of PC software processing, the compression and decompression processing modules 104 and 106 constitute CPU software processing parts. The ADC 102 may be a video capture card. The frame memories 103 and 107 may be, for example, memories such as main memory and video memory. The DAC 108 may be a graphic accelerator card. The recorder 105 may be constituted by a hard disc drive or the like.

When the system becomes unable to execute full frame real time processing due to the CPU performance insufficiency, the frame rate controller 110 executes a control process of controlling the frame rate of data read out from the frame memory 103 to the compression processing module 104 to be constant. When the compression processing module 104 becomes unable to execute full frame real time compression processing, it executes a thinning-out process, in which compression processing on some frames is omitted, thus generating digital compressed data at a substantially reduced frame rate while retaining a fixed standard frame rate. The decompression processing module 106 has a frame skipping function of skipping some frames in the decompression processing for reproduction synchronous to voice data with omitting a part of the frame decompression process.

The frame rate controller 110 executes frame drop-out judgment by obtaining time data of each captured frame from the ADC 102. The controller 110 then controls the frame rate of the input to the compression processing module 104 to be constant by executing a frame interpolation process concerning the dropped-out frames. The controller 110 normally designates a pointer of a memory area with each frame data stored therein to the compression processing module 104. The frame rate controller 110 performs execution of frame interpolating

processing in frame thinning-out processing in the compression processing module 104 independently of each other. In this way, the frame rate controller 110, which can hold a constant intrinsic frame rate at all times by executing the frame interpolating processing in the event when the system becomes unable to execute full frame real time frame capturing, and also the compression processing module, which has a frame thinning-out function of reducing the actual frame rate while holding the constant intrinsic frame rate. Even when the system becomes unable to execute full frame real time reproducing processing due to CPU performance insufficiency, it can perform time shift reproduction in a given time while holding synchronism with voice. This is so because the system comprises the decompression processing module, which has the function of thinning out frames for continuing reproduction synchronous to voice. The system can record and reproduce compressed data involving much motion even when it becomes unable to execute full frame real time reproducing processing due to CPU performance insufficiency. This is so because of the fact that the compression processing module has the function of executing frame thinning-out processing preferentially from frames obtained by frame interpolation and also that the decompression processing module has the function of executing frame skipping processing preferentially from thinned-out frames.

Claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,966,495 to Takahashi et al. in view of U.S. Patent No. 6,163,646 to Tanaka et al. This rejection is respectfully traversed for the reason that the combination of Takahashi et al. and Tanaka et al. fail to show or suggest the claimed invention.

Takahashi et al. disclose a recording and reproducing apparatus that includes a recording circuit for forming predetermined memory units by correlating video information and audio information with retrieval information for retrieval of the video information and the audio information, and sequentially recording the predetermined memory units in a solid-state memory device at intervals of predetermined time, a file generating circuit for generating a retrieval information file for retrieving the video information and the audio information on the basis of the retrieval information, and a reproducing circuit for reading out the

video information and the audio information from the solid-state memory device on the basis of information contained in the retrieval information file and reproducing a video signal and an audio signal from the solid-state memory device, during retrieval of information recorded in the solid-state memory device.

In short, Takahashi et al. disclose what is generally acknowledged as prior art in the present application. As such, Takahashi et al. neither recognize nor solve the problem solved by the claimed invention, to wit, performance insufficiency of the CPU when the system is operated in parallel with other applications or at the moment of starting the same and, in consequence, it becomes impossible to obtain full frame real time capturing, real time compression and real time decompression, leading to missing of frame data in the compression processing and delay in the reproducing processing and also to a further problem of deviation from synchronism of image and voice to each other. The Examiner appears to recognize this since he makes no mention of Takahashi et al. disclosing a frame rate controller.

Tanaka et al. disclose an apparatus for a synchronized playback of compressed digital data of audio-video signals with a simple configuration to be applied to a system having comparatively low data processing ability, independent of resolution of a software timer of the system, the apparatus of the invention obtains a reference time indicating reproduction time passage of the audio signal component from reproduced data amount of the audio signal component, and detects progress of the video signal component in reference to the reference time. There is nothing in Tanaka et al. regarding recording a signal and, like Takashi et al., Tanaka et al. neither recognizes nor solves the problem solved by the claimed invention.

In particular, neither Takahashi et al. nor Tanaka et al., taken singly or in combination, disclose, teach or otherwise suggest "a frame rate controller for controlling the compression processing module *to hold a constant intrinsic frame rate by executing frame interpolating processing*" (emphasis added), as specifically recited in claim 1.

Claims 2, 3, 4, 6, and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over the patents to Takahashi et al. and Tanaka et al., further in view

of U.S. Patent Publication 2004/0240744 to Honda et al. This rejection is also respectfully traversed for the reason that the combination of Takahashi et al., Tanaka et al, and Honda et al. fail to disclose, teach or otherwise suggest the claimed invention.

Takahashi et al. and Tanaka et al. have been distinguished with respect to claim 1. As to claim 2, neither Takahashi et al. nor Tanaka et al., taken singly or in combination, disclose, teach or otherwise suggest "a frame rate controller for controlling the frame rate of the compression processing module to be constant by executing a frame interpolating processing, and wherein the compression processing module has a frame thinning-out function of reducing an actual frame rate while holding a constant intrinsic frame rate", as specifically recited. As to claim 6, neither Takahashi et al. nor Tanaka et al., taken singly or in combination, disclose, teach or otherwise suggest "executing a frame skipping processing when full frame real time decompression processing cannot be executed", as specifically recited. As to claim 3, neither Takahashi et al. nor Tanaka et al., taken singly or in combination, disclose, teach or otherwise suggest "a frame rate controller for controlling the compression processing module to be constant by executing frame interpolating processing, wherein the decompression processing module has a function of thinning out frames for continuing reproduction synchronous to voice", as specifically recited.

Honda et al. disclose an image data compression or expansion method and apparatus for use in a remote monitoring system which employs an image change detection means for detecting a change in image based on input image data and means for controlling a frame rate of outputted compressed image data. In other words, Honda et al. provide a variable frame rate depending on the rate of motion of an input image. This is quite different from what the claimed invention accomplishes. Specifically, the claimed invention aims to control the frame rate of the compression processing module to be constant by executing a frame interpolating processing. Clearly, there is no possibility of modifying the combined teachings of Takahashi et al. and Tanaka et al. with that of Honda et al. and arriving at the claimed invention.

As to claims 4 and 7, these claims are respectively dependent on claims 1 and 6 and, therefore, patentable for the reasons advanced above.

Claims 5 and 8 were rejected under 35 U.S.C. §103(a) as being unpatentable over the patents to Takahashi et al., Tanaka et al. and Honda et al., further in view of U.S. Patent No. 6,697,566 to Fujinami et al. This rejection is respectfully traversed for the reason that the combination of Takahashi et al., Tanaka et al., Honda et al., and Fujinami et al., does not disclose, teach or otherwise suggest the claimed invention.

The combination of Takahashi et al., Tanaka et al. and Honda et al. have been distinguished above. Fujinami et al. is relied on by the Examiner for a disclosure of "signals . . . encoded with the characteristic recording information and furthermore added to the data bit stream"; however, this adds nothing which would overcome the inadequacies of the basic combination of references, as discussed above.

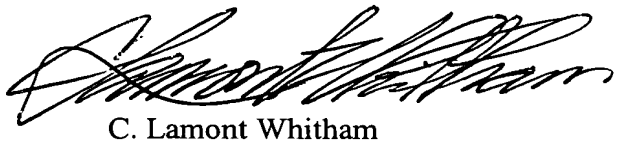
The patents to Oku et al. (U.S. Patent No. 6,710,817) and Kim (U.S. Patent No. 6,862,402), cited but not relied on, have been reviewed. Neither of these reference are believed to be pertinent to the claimed invention for the reasons advanced above with respect to the references relied on by the Examiner.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 1 to 12 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



C. Lamont Whitham
Reg. No. 22,424

Whitham, Curtis & Christofferson, P.C.
11491 Sunset Hills Road, Suite 340
Reston, VA 20190

Tel. (703) 787-9400
Fax. (703) 787-7557

Customer No.: 30743